

TC74HC573AP, TC74HC573AF, TC74HC573AFW

Octal D-Type Latch with 3-State Output

The TC74HC573A is a high speed CMOS OCTAL LATCH with 3-STATE OUTPUT fabricated with silicon gate C²MOS technology.

It achieves the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.

Its 8-bit D-type latch is controlled by a latch enable input (LE) and a output enable input (\overline{OE}).

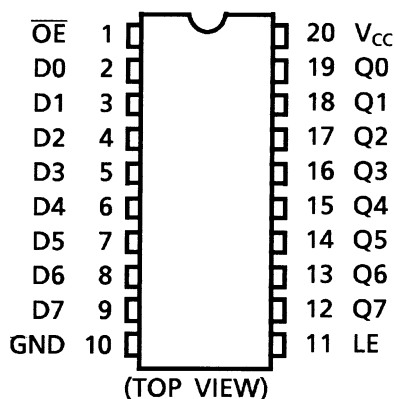
When the \overline{OE} input is high, the eight outputs are in a high impedance state.

All inputs are equipped with protection circuits against static discharge or transient excess voltage.

Features

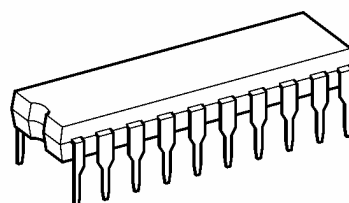
- High speed: $t_{pd} = 13 \text{ ns}$ (typ.) at $V_{CC} = 5 \text{ V}$
- Low power dissipation: $I_{CC} = 4 \mu\text{A}$ (max) at $T_a = 25^\circ\text{C}$
- High noise immunity: $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (min)
- Output drive capability: 15 LSTTL loads
- Symmetrical output impedance: $|I_{OH}| = I_{OL} = 6 \text{ mA}$ (min)
- Balanced propagation delays: $t_{pLH} \approx t_{pHL}$
- Wide operating voltage range: $V_{CC} \text{ (opr)} = 2 \text{ to } 6 \text{ V}$
- Pin and function compatible with 74LS573

Pin Assignment



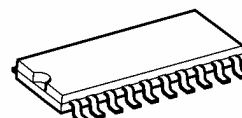
Note: xxxFW (JEDEC SOP) is not available in Japan.

TC74HC573AP

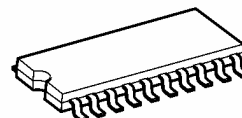


DIP20-P-300-2.54A

TC74HC573AF

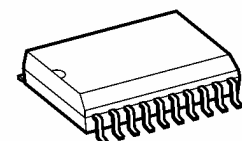


SOP20-P-300-1.27A



SOP20-P-300-1.27

TC74HC573AFW

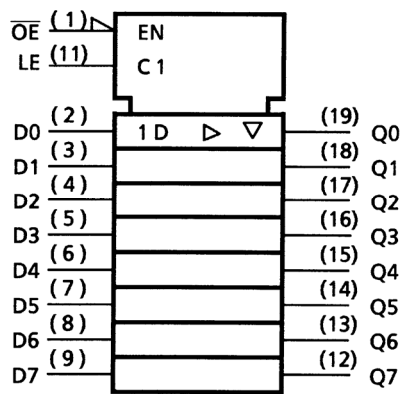


SOL20-P-300-1.27

Weight

DIP20-P-300-2.54A	: 1.30 g (typ.)
SOP20-P-300-1.27A	: 0.22 g (typ.)
SOP20-P-300-1.27	: 0.22 g (typ.)
SOL20-P-300-1.27	: 0.46 g (typ.)

IEC Logic Symbol



Truth Table

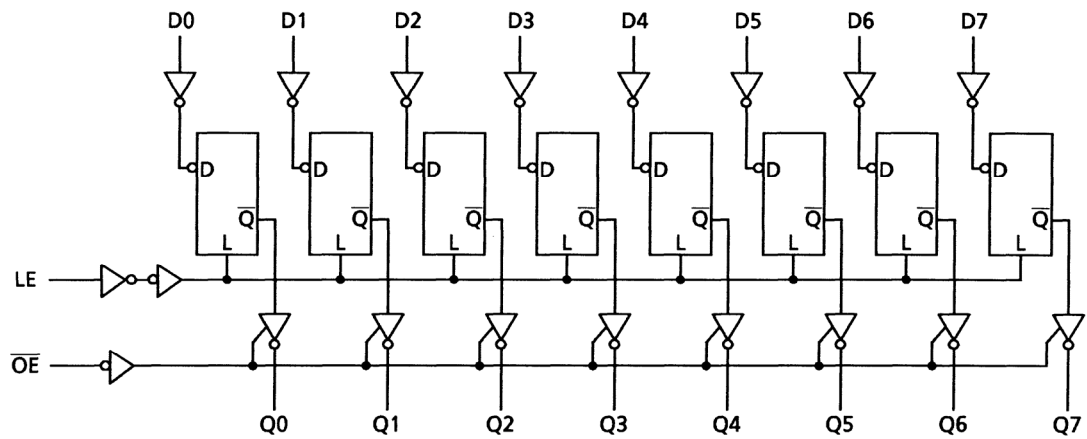
Inputs			Output
\overline{OE}	LE	D	Q
H	X	X	HZ
L	L	X	Q_n
L	H	L	L
L	H	H	H

X: Don't care

HZ: High impedance

Q_n : Q outputs are latched at the time when the LE input is taken to a low logic level.

System Diagram



Absolute Maximum Ratings (Note 1)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V_{CC}	-0.5 to 7	V
DC input voltage	V_{IN}	-0.5 to $V_{CC} + 0.5$	V
DC output voltage	V_{OUT}	-0.5 to $V_{CC} + 0.5$	V
Input diode current	I_{IK}	± 20	mA
Output diode current	I_{OK}	± 20	mA
DC output current	I_{OUT}	± 35	mA
DC V_{CC} /ground current	I_{CC}	± 75	mA
Power dissipation	P_D	500 (DIP) (Note 2)/180 (SOP)	mW
Storage temperature	T_{stg}	-65 to 150	°C

Note 1: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

Note 2: 500 mW in the range of $T_a = -40$ to 65°C . From $T_a = 65$ to 85°C a derating factor of $-10\text{ mW}/^\circ\text{C}$ shall be applied until 300 mW.

Recommended Operating Conditions (Note)

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	2 to 6	V
Input voltage	V_{IN}	0 to V_{CC}	V
Output voltage	V_{OUT}	0 to V_{CC}	V
Operating temperature	T_{opr}	-40 to 85	°C
Input rise and fall time	t_r, t_f	0 to 1000 ($V_{CC} = 2.0\text{ V}$) 0 to 500 ($V_{CC} = 4.5\text{ V}$) 0 to 400 ($V_{CC} = 6.0\text{ V}$)	ns

Note: The recommended operating conditions are required to ensure the normal operation of the device. Unused inputs must be tied to either VCC or GND.

Electrical Characteristics

DC Characteristics

Characteristics	Symbol	Test Condition		Ta = 25°C			Ta = −40 to 85°C		Unit	
				V _{CC} (V)	Min	Typ.	Max	Min		Max
High-level input voltage	V _{IH}	—		2.0 4.5 6.0	1.50 3.15 4.20	— — —	— — —	1.50 3.15 4.20	V	
Low-level input voltage	V _{IL}	—		2.0 4.5 6.0	— — —	— — —	0.50 1.35 1.80	— — —	V	
High-level output voltage	V _{OH}	V _{IN} = V _{IH} or V _{IL}	I _{OH} = −20 μA	2.0	1.9	2.0	—	1.9	—	V
				4.5	4.4	4.5	—	4.4	—	
				6.0	5.9	6.0	—	5.9	—	
			I _{OH} = −6 mA	4.5	4.18	4.31	—	4.13	—	
I _{OH} = −7.8 mA	6.0	5.68		5.80	—	5.63	—			
Low-level output voltage	V _{OL}	V _{IN} = V _{IH} or V _{IL}	I _{OL} = 20 μA	2.0	—	0.0	0.1	—	0.1	V
				4.5	—	0.0	0.1	—	0.1	
				6.0	—	0.0	0.1	—	0.1	
			I _{OL} = 6 mA	4.5	—	0.17	0.26	—	0.33	
				I _{OL} = 7.8 mA	6.0	—	0.18	0.26	—	
3-state output off-state current	I _{OZ}	V _{IN} = V _{IH} or V _{IL} V _{OUT} = V _{CC} or GND		6.0	—	—	±0.5	—	±5.0	μA
Input leakage current	I _{IN}	V _{IN} = V _{CC} or GND		6.0	—	—	±0.1	—	±1.0	μA
Quiescent supply current	I _{CC}	V _{IN} = V _{CC} or GND		6.0	—	—	4.0	—	40.0	μA

Timing Requirements (input: t_r = t_f = 6 ns)

Characteristics	Symbol	Test Condition		Ta = 25°C		Ta = -40 to 85°C	Unit
				V _{CC} (V)	Typ.	Limit	
Minimum pulse width (LE)	t _W (H)	—	—	2.0	—	75	95
				4.5	—	15	19
				6.0	—	13	16
Minimum set-up time (data)	t _s	—	—	2.0	—	50	65
				4.5	—	10	13
				6.0	—	9	11
Minimum hold time (data)	t _h	—	—	2.0	—	5	5
				4.5	—	5	5
				6.0	—	5	5

AC Characteristics (input: $t_r = t_f = 6 \text{ ns}$)

Characteristics	Symbol	Test Condition			Ta = 25°C			Ta = -40 to 85°C		Unit
			CL (pF)	V _{CC} (V)	Min	Typ.	Max	Min	Max	
Output transition time	t_{TLH} t_{THL}	—	50	2.0	—	20	60	—	75	ns
				4.5	—	6	12	—	15	
				6.0	—	5	10	—	13	
Propagation delay time (LE-Q)	t_{pLH} t_{pHL}	—	50	2.0	—	50	115	—	145	ns
				4.5	—	15	23	—	29	
				6.0	—	13	20	—	25	
			150	2.0	—	60	155	—	195	
				4.5	—	20	31	—	39	
				6.0	—	17	26	—	33	
Propagation delay time (D-Q)	t_{pLH} t_{pHL}	—	50	2.0	—	42	110	—	140	ns
				4.5	—	14	22	—	28	
				6.0	—	12	19	—	24	
			150	2.0	—	57	150	—	190	
				4.5	—	19	30	—	38	
				6.0	—	16	26	—	32	
Output enable time	t_{pZL} t_{pZH}	$R_L = 1 \text{ k}\Omega$	50	2.0	—	55	140	—	175	ns
				4.5	—	17	28	—	35	
				6.0	—	14	24	—	30	
			150	2.0	—	66	180	—	225	
				4.5	—	22	36	—	45	
				6.0	—	19	31	—	38	
Output disable time	t_{pLZ} t_{pHZ}	$R_L = 1 \text{ k}\Omega$	50	2.0	—	40	125	—	155	ns
				4.5	—	17	25	—	31	
				6.0	—	15	21	—	26	
Input capacitance	C_{IN}	—	—	—	—	5	10	—	10	pF
Output capacitance	C_{OUT}	—	—	—	—	10	—	—	—	pF
Power dissipation capacitance	C_{PD} (Note)	—	—	—	—	51	—	—	—	pF

Note: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation:

$$I_{CC}(\text{opr}) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/8 \text{ (per latch)}$$

And the total C_{PD} when n pcs. of latch operate can be gained by the following equation:

$$C_{PD}(\text{total}) = 33 + 18 \cdot n$$

Package Dimensions

DIP20-P-300-2.54A

Unit : mm

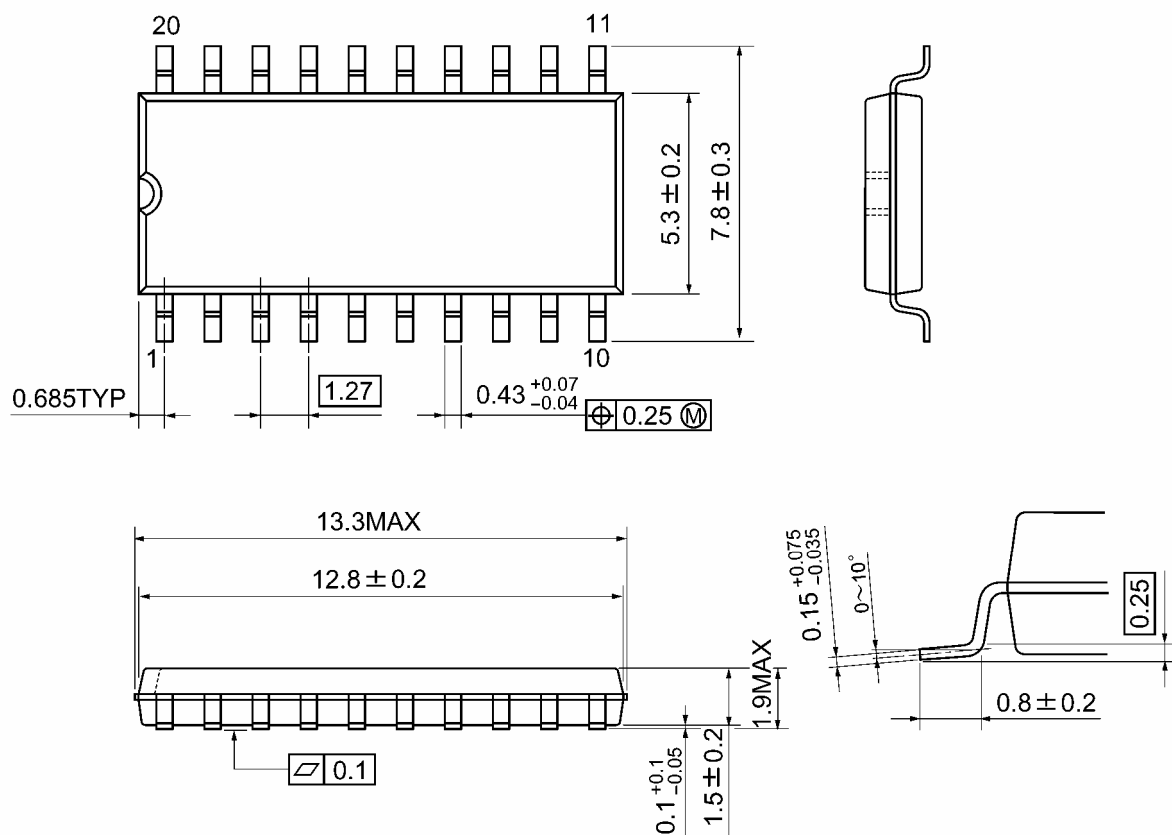


Weight: 1.30 g (typ.)

Package Dimensions

SOP20-P-300-1.27A

Unit: mm

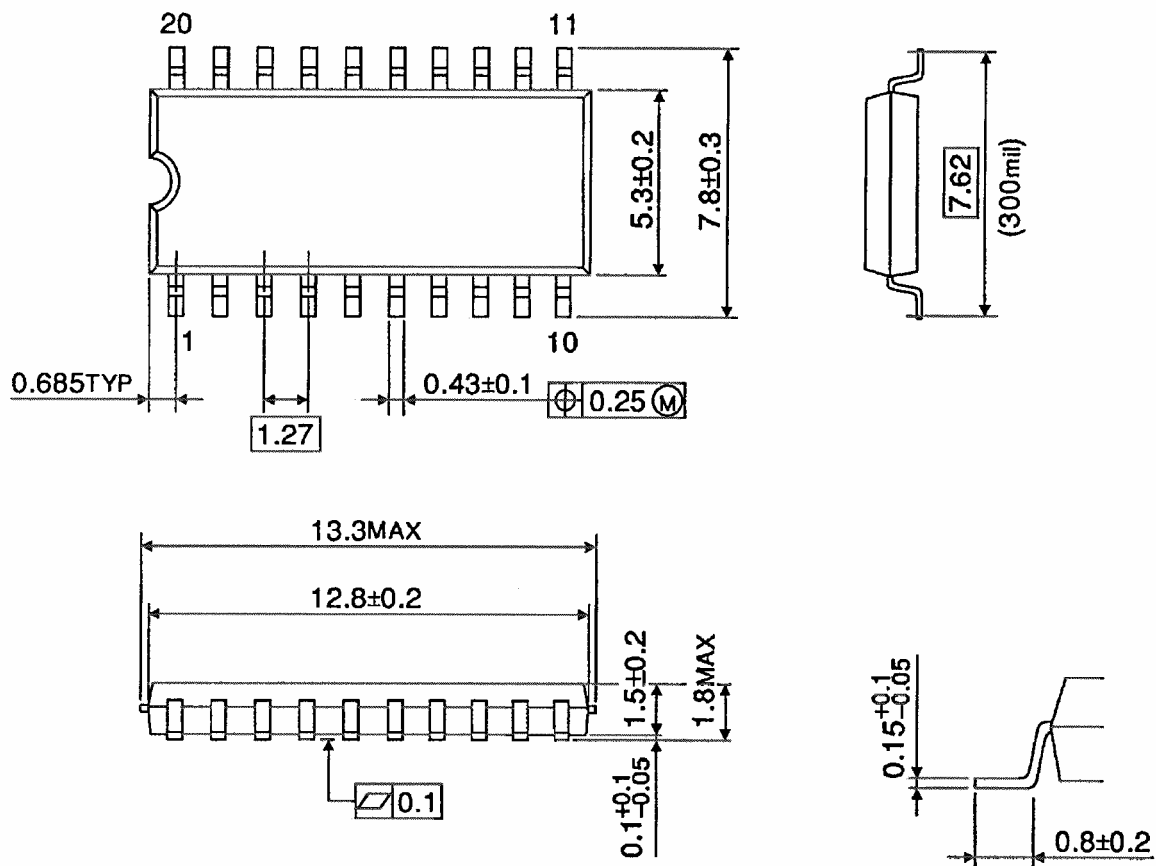


Weight: 0.22 g (typ.)

Package Dimensions

SOP20-P-300-1.27

Unit : mm

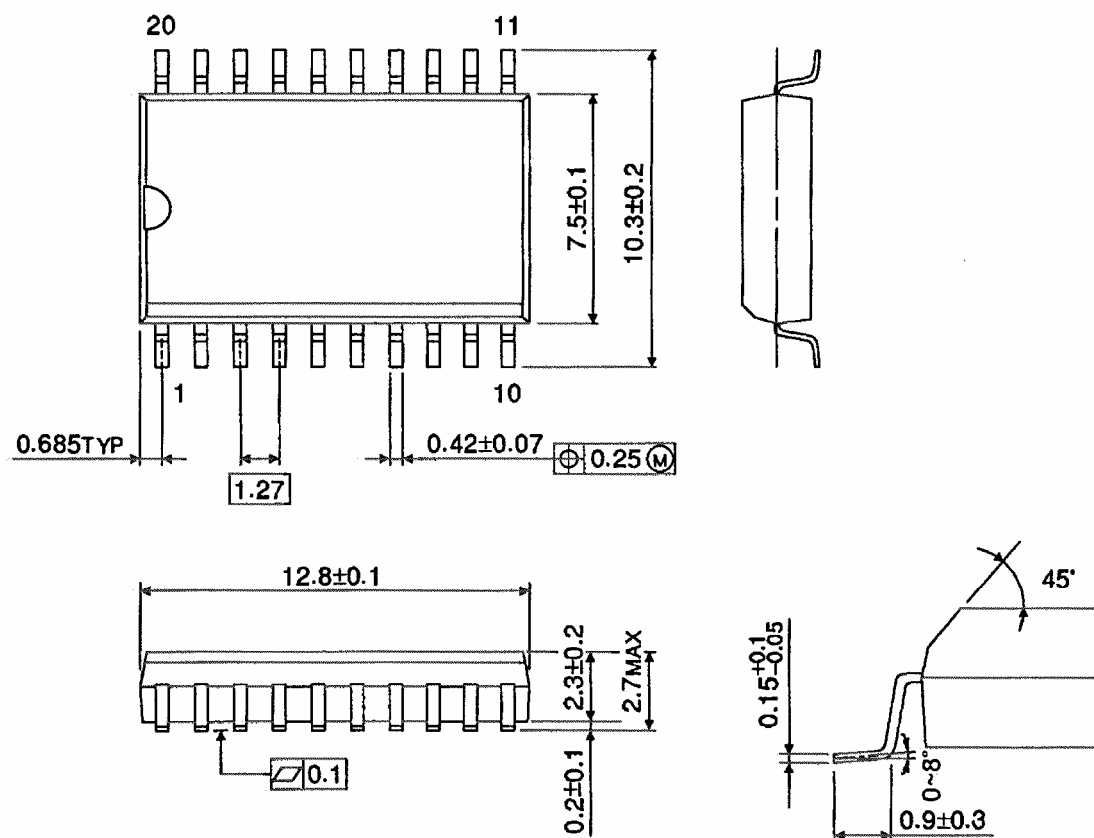


Weight: 0.22 g (typ.)

Package Dimensions (Note)

SOL20-P-300-1.27

Unit : mm



Note: This package is not available in Japan.

Weight: 0.46 g (typ.)

Note: Lead (Pb)-Free Packages

DIP20-P-300-2.54A SOP20-P-300-1.27A

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